

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in Joints for Plastics Pipes

We, KUNSTSTOFFWERK GEBRUDER ANGER G.M.B.H., & Co., a German Company, of Einsteinstrasse 104, Munich 8, Germany, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a joint between plastics pipes, particularly a joint for connecting pipes made of a synthetic thermoplastics material, for example polyvinyl chloride, wherein the spigot end of one of the pipes is inserted into the enlarged socket end of the other pipe and the socket is formed at a distance from its lip with an annular groove for the reception therein of a sealing ring of elastic material.

For connecting plastics pipes mainly two types of joint have proved to be satisfactory. In one type of joint the clearance between the socket and the spigot is relatively large. The clearance is bridged by the sealing ring inside the annular groove or corrugation, said ring usually consisting of rubber and keeping the pipes in concentric alignment. This form of construction permits a fairly considerable degree of angular misalignment when the pipes are being laid. Moreover, since it is usually the practice to provide a lubricant, relatively little effort is needed to insert the spigot into the socket. Such a pipe joint has the advantage that it is capable of absorbing thermal expansion of the pipes after these have been laid. However, it has the disadvantage of being unable to take up considerable axial thrust and such a joint may therefore pull open when it is subjected to hydrostatic or hydrodynamic pressures.

The second type of joint has a socket without an annular groove and the clearance between the socket and the spigot is only small. In this arrangement the joint is sealed by adhesive bonding, the clearance gap being substantially filled with the adhesive.

Such a joint is more difficult to establish in practice because it involves handling the adhesive. Moreover, the tighter clearance makes the insertion of the spigot more difficult. However, in some applications the particular property of such a joint of rigidly connecting the two pipe ends and of being incapable of being pulled apart is an advantage.

Finally it has been proposed to provide the latter type of joint with an annular groove to permit of the optional creation of a detachable joint with the aid of a sealing ring. However, this form of construction introduces the additional drawback that when an adhesive joint is made both the lip of the socket and the groove wipe off the adhesive and in the rough working conditions prevailing on the site this often leads to the creation of defective adhesive joints. Moreover, such a joint permits either no angular misalignment or at best only slight angular misalignment between the two pipes.

The joint according to the invention possesses all the advantages of the last described form of construction without suffering from its drawbacks. The invention consists in that the internal diameter of the socket in the region between the annular groove and its transition into the pipe exceeds the maximum permissible external pipe diameter only slightly by an amount which still permits the creation of a satisfactory adhesive bond in this region, whereas in the region between the annular groove and the lip of the socket the latter exceeds the external pipe diameter sufficiently to prevent the inserted spigot in this region from touching the socket when the spigot is angularly misaligned.

The proposed form of construction permits a spigot to which an adhesive has been applied to be inserted into the socket without risk of the adhesive being wiped off unduly in the region between the lip of the socket and the annular groove, so that the creation of a satisfactory bond behind the annular groove is assured.

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When establishing the joint with an adhesive no sealing ring need be provided in the groove. The enlarged region preceding the bonding zone proper also facilitates the insertion of the 5 spigot. Another substantial advantage of the proposed arrangement is that, even when the pipes connected by the spigot and socket joint and irrespectively as to whether an adhesive or a simple sealing ring is used, angular misalignment will not affect the primarily sensitive 10 lip of the socket since the spigot makes contact with the socket wall only at the edge between the annular groove and the internal socket wall. This region is better calculated to absorb 15 forces than the lip of a pipe. Finally a simple push-in joint with a sealing ring is as simple to make as in known forms of construction of similar kind.

A particularly favourable arrangement is one 20 in which the annular groove has an approximately rectangular cross section since this provides the ring with better opportunities to yield and deform as required.

A preferred embodiment is characterised by 25 the provision, roughly in the middle of the socket portion extending between the annular groove and the transition of the socket into the pipe, of an annular bulb having a minimum internal diameter which is at least substantially equal to the external diameter of the 30 inserted spigot end of the pipe.

Even in the absence of a sealing ring in the 35 groove such an annular bulb ensures satisfactory axial alignment of the cooperating pipe ends. On the other hand, it does not reduce the ability of the joint to allow angular misalignment of the pipes since the annular bulb — at least theoretically — makes only linear contact with the inserted spigot. Moreover, 40 concentricity ensures an even distribution of the adhesive.

The annular bulb is preferably formed by a circumferential constriction formed in the 45 socket.

Embodiments of the invention will be hereinafter described by reference to the accompanying drawings in which:

Figure 1 is an axial section of one half of a pipe joint according to the invention in 50 which an adhesive is used;

Figure 2 is a similar representation of the same pipe joint in the form of a detachable push-in joint with a sealing ring;

Figure 3 is a similar representation of a preferred embodiment of the pipe joint comprising the use of a sealing ring; and

Figure 4 is a similar representation of the 55 form of construction of a socket according to Figure 3, comprising the use of an adhesive for making the joint.

In the embodiments shown in Figures 1 and 2 the socket 1 of a pipe 2 is formed with an annular groove 3 intended for the reception of a rubber sealing ring 4. The spigot end 65 of the cooperating pipe 5 is provided with a bevelled lip 6. Both pipes are made of polyvinyl chloride.

If the joint is to be adhesively sealed, as illustrated in Figure 1, then an adhesive conventionally used for such a purpose is applied either to the outside of the spigot end of pipe 5 and/or to the inside of the cooperating socket as far as the groove and the spigot is then inserted into the socket 1, as shown in Figure 1. In the drawing the adhesive 7 in the annular gap is shown in black. It will be seen that in either case the conditions for angular misalignment of the pipes are relatively good.

For making the joint in the manner illustrated in Figure 2 only the sealing ring is inserted into the groove and the spigot end is externally provided with a lubricant before it is inserted into the socket in the conventional and usual way, allowance being made for the clearance needed to permit thermal expansion of the pipes.

The cylindrical portion of the socket which in the drawing is on the right hand side of the groove should preferably have a length equal to about 50 to 100 percent of the pipe diameter, whereas the cylindrical portion of the socket on the left of the annular groove, which has a slightly wider internal diameter, should in order of magnitude preferably have a length equal to at least 5 to 10 percent of the diameter of the pipe.

In the form of construction of the socket represented in Figures 3 and 4 the spigot end 15 is inserted into the enlarged socket-forming end 10 of the cooperating pipe 12. Again the internal diameter of the socket portion 18 between the lip of the socket and the annular groove 13 exceeds that of the socket portion between the annular groove 13 and the pipe 12 proper. Furthermore, this latter portion of the socket has a constriction 19 which is formed by a roughly conical convergence on each side of a vertex in the middle forming an annular bulb inside this portion of the 105 socket.

Figure 3 shows this form of joint made with a rubber sealing ring 14 without an adhesive.

Figure 4 illustrates the employment of an adhesive 17 without a sealing ring. If an adhesive bond in the region between the constriction and the annular groove should not be sufficient the region of the socket between the pipe proper and the constriction may likewise be provided with adhesive before insertion of the spigot. As shown in Figure 4 the entire length of the socket behind the groove is then used as a bonding surface.

WHAT WE CLAIM IS:—

1. A joint for connecting plastics pipes in which the spigot end of one of the pipes is inserted into the enlarged socket end of the other pipe and the socket is formed some distance from its lip with an annular groove for the reception therein of a sealing ring made

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of an elastic material, characterised in that the internal diameter of the socket in the region between the annular groove and its transition into the pipe exceeds the maximum permissible external pipe diameter by only a small margin allowing the creation of a satisfactory adhesive bond in this region, whereas in the region between the annular groove and the lip of the socket it exceeds the external pipe diameter sufficiently to prevent contact in this zone between the spigot and the socket when the inserted spigot end is angularly deflected out of axial alignment.

2. A joint for connecting plastics pipes according to claim 1, characterised in that the annular groove has a substantially rectangular cross section.

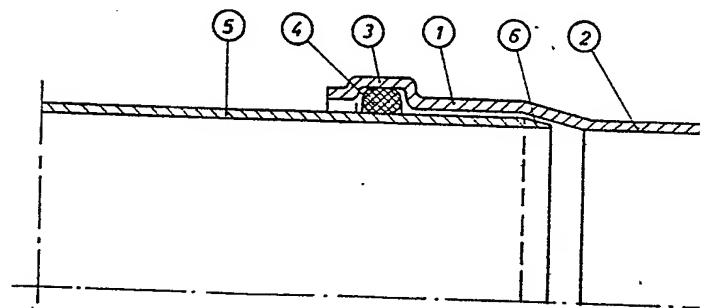
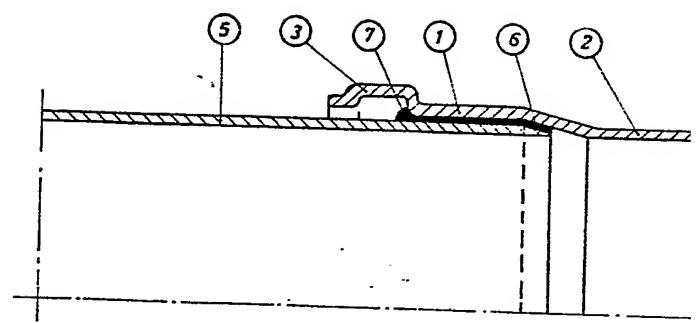
3. A joint for connecting plastics pipes according to claim 1 or 2, characterised by the provision roughly in the middle of the socket portion between the annular groove and the transition between the socket and the pipe of an annular bulb having a minimum internal diameter which is at least substantially equal to the external diameter of the inserted spigot.

4. A joint for connecting plastics pipes according to claim 3, characterised in that the annular bulb is provided by an annular constriction formed in the socket.

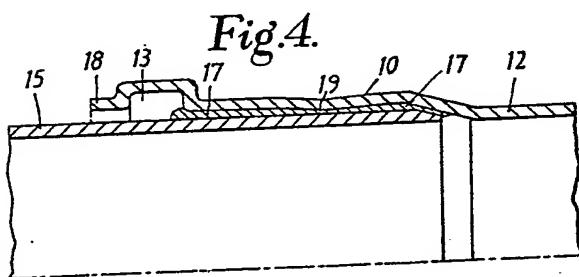
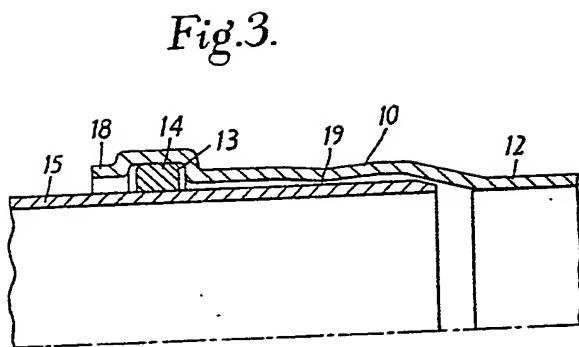
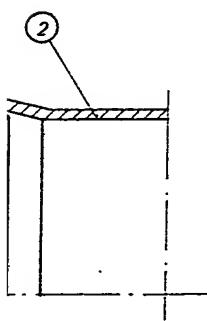
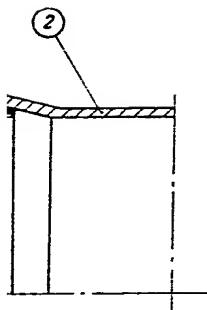
5. A joint for connecting plastics pipes substantially as hereinbefore described with reference to any of the accompanying drawings.

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copies may be obtained.

MATHYS & SQUIRE,
Chartered Patent Agents,
Staple House,
51/52 Chancery Lane,
London, W.C.2.
Agents for the Applicants.



1112326 COMPLETE SPECIFICATION
2 SHEETS *This drawing is a reproduction of
the Original on a reduced scale*
Sheets 1 & 2



1112326 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of
the Original on a reduced scale
Sheets 1 & 2

Fig.3.

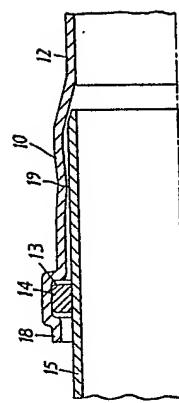


Fig.4.

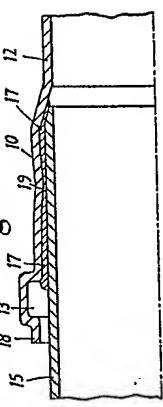


Fig.1

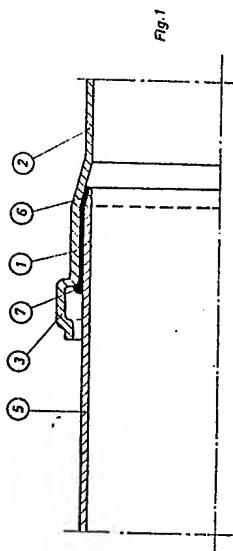
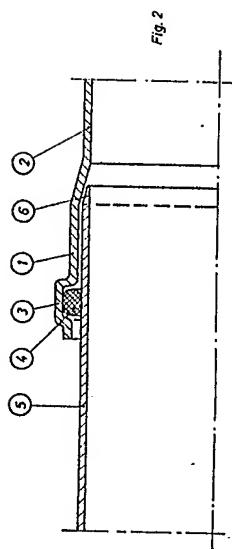


Fig.2



DERWENT-ACC-NO: 1968-04407Q

DERWENT-WEEK: 196800

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TITLE: Joint with elastic seal for
spigot and groove ended

PATENT-ASSIGNEE: KUNSTSTOFFWERK ANGER GMBH [KUNW]

PRIORITY-DATA: 1965DE-K51933 (August 6, 1965)

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CIPS	F16L47/08 20060101

ABSTRACTED-PUB-NO: GB 1112326 A

BASIC-ABSTRACT:

Plastics pipe joint consists of a socket formed on one pipe into which the adjacent pipe end is spigoted. The socket is recessed near its lip for an elastic sealing ring.

A permanent joint with adhesive and without the ring is optional, without wiping the adhesive on entry, and misalignment is accommodated, whilst the pipes are accurately located. The part of the socket between the groove and the socket bottom is only slightly larger than the spigot diameter, so that a good adhesive bond is possible. On the other hand the lip of the socket is radially clear of the spigot diameter and does not wipe or touch the socket on misalignment. The socket is preferably slightly constricted in diameter near its mid length. The pipes are of synthetic thermoplastic e.g. P.V.C.

TITLE-TERMS: JOINT ELASTIC SEAL SPIGOT GROOVE END

DERWENT-CLASS: A00

CPI-CODES: A12-H02;

POLYMER-MULTIPUNCH-CODES-AND-KEY-SERIALS:

Multipunch Codes: 061 062 063 489 674 676 688